

REMARKS

By the present amendment, claim 1 has been cancelled without prejudice or disclaimer. It is submitted that this amendment does not raise new issues which would require further consideration and/or search. In addition, it is submitted that such an amendment places the application in better form for appeal by materially reducing or simplifying the issues for appeal. Furthermore, no additional claims are presented without cancelling a corresponding number of finally rejected claims. In view of the above, it is submitted that entry of the above amendment is in order and such is respectfully requested.

In the Office Action, claim 1 was rejected under 35 USC §103(a) as being unpatentable over the patent to Drowley in view of the newly cited patent to Gotou. In making this rejection, the Gotou patent was applied for its disclosure of an insulating film on a transistor where contact holes are formed. It then was asserted that it would have been obvious to incorporate contact holes formed in the insulation layer in the structure of the Drowley patent "in order to make contact to the source and drain regions during further metallization." Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

As mentioned above, claim 1 has been cancelled without prejudice or disclaimer.

Thus, it is submitted that the rejection is now moot. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Claims 2, 3, 5 and 6 were rejected under 35 USC §103(a) as being unpatentable over the patent to Drowley in view of the patent to Gotou and further in view of the patent to Park. In addition, claim 4 was rejected under 35 USC 103(a) as being unpatentable over the same patents. In making these rejections, the patents to Drowley and Gotou were applied as in the previous rejection and it was further asserted that the patent to Park teaches that a CMOS image sensor device comprises more than two MOS transistors. Reconsideration of these rejections in view of the above claim amendments and the following comments is respectfully requested.

Before discussing the rejections in detail, a brief review of the presently claimed invention may be quite instructive. The invention as defined by claim 2 includes three MOS transistors (T1, T2, and T3) and a photodiode (PD) to form a circuit shown in Fig. 1. As denoted at point A shown in Fig. 1, a drain of a first MOS transistor (T1) which connects to the impurity region of the photodiode (PD) is connected to a gate of a second transistor (T2) through a contact hole.

Further, it is feature of the subject invention that a silicide film is not formed through a contact hole (35a) on a surface of the drain region of the first MOS transistor (T1) which connects to the impurity region of the photodiode PD as shown in Fig. 11C. However, the

silicide film (33) is formed on each surface of the sources and drains of the first, second and third MOS transistors (T1, T2 and T3) except for the drain of the first MOS transistor (T1) as shown in Fig. 10A. Since a silicide film is not formed on a surface of the drain region of the first MOS transistor (T1) which connect to the impurity region of the photodiode PD, a leak current owing to metal atoms in the silicide film does not occur in the drain region, and thus the CMOS image sensor shows less noise.

On the other hand, the silicide film (33) is formed on each surface of the sources and drains on the first, second and third MOS transistors (T1, T2, and T3) except for the drain of the first MOS transistor (T1). These silicide films reduce the contact resistance in the source and drain to speed up a circuit operation and do not produce adverse effects on the photodiode (PD) of the CMOS image sensor. It is submitted that the patents to Drowley, Gotou and Park do not teach or suggest, whether taken singly or in combination, the CMOS image sensor as defined by independent claim 2 and the claims dependent thereon.

The Drowley patent, as shown in its drawings, discloses a device having a photodiode and a plural MOS transistor. However, the device according to the patent does not have a contact such as denoted at point A in Fig. 1 of the subject application. As such, there is no problem of a leak current occurring in a contact A in the device of the Drowley patent. It is submitted that these teaching deficiencies are not supplied by the remainder of the cited patents.

The device according to Park patent, similarly to that of the Drowley patent, does not have a contact such as denoted at point A in Fig. 1 of the present application. Therefore, there is not a problem of a leak current occurring in contact A in the device taught by the Park patent.

The Gotou patent teaches that a source region (6") and a drain region (7) are exposed by contact holes in the insulating film (21). Further, metal atoms are injected only in the source region (6") by metal ion implantation in order to intentionally cause a leak current in the source region. The object according to the Gotou patent is to form a current path between source region and the semiconductor substrate and to thereby eliminate a kink phenomenon.

In distinct contrast, it is an object of the presently claimed invention to reduce leak current in contact A. As described in the above, the cited patents do not even have an object the same as the object of the present invention.

It further is submitted that one of ordinary skill in the art would not have combined the references as asserted by in the Action. In this regard, it is submitted that one of ordinary skill in the image sensor art would not have looked to the teachings of the Gotou patent. As is well settled, there must be some suggestion in the art to make the modifications as asserted in the Action. In particular in this regard, it was asserted that one of ordinary skill the art would have modified the Drowley patent to include an insulating

layer having contact holes so as to contact the source and drain regions during further metallization. It is submitted that one of ordinary skill in the art would not have been motivated to provide further metallization.


For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 2 through 6 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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